

IN THE DRAWINGS

Please amend FIGS. 1 through 5 as shown in Exhibit A attached hereto.

REMARKS

Claims 1-23 are pending in the current application. Applicant has amended claims 1-4, 12, 14, 15, and 21. Reexamination and reconsideration of all of the claims, as amended, are respectfully requested.

Drawings

The Office Action rejected FIG. 1 under 37 C.F.R. 1.84(u)(1) based on two separate views being disclosed. Applicant has amended FIG. 1 to include FIG. 1A and FIG. 1B and have corrected the specification accordingly.

The Office Action rejected FIG. 1 through FIG. 5 under 37 C.F.R. 1.84(q) based on incomplete specific lead lines. Applicant has amended FIG. 1 through FIG. 5 to include arrow lines for each element cited.

The Office Action objected to the drawings under 37 C.F.R. 1.84(p)(5) because they include the references 204, 206, 402a, 402b, 402c, and 402d not mentioned in the description. Applicant has amended the specification to include each of these references.

Applicant submits that the Replacement Sheets provided in combination with the other Figures and the amendments to the specification text render the specification and drawings in compliance with 37 CFR §§ 1.84 and 1.121.

Specification

The Office Action objected to the specification because of certain informalities. Applicant appreciates the identification of the typographical error, has corrected the error, and submits that all informalities have now been corrected in the specification.

Claim Objections

The Office Action objected to claims 3, 4, 14, 15, and 16 under 37 C.F.R. 1.75(a) because of various informalities. Applicant has amended claims 2, 3, 4, 14, and 15 and submits that all informalities have now been corrected in the specification.

The Office Action objected to claim 16. However, the Office Action fails to specifically articulate the objection for claim 16. Applicant does not agree with the need to amend claim 16, submits that claim 16 is in proper form, and would prefer to maintain the claim as written.

35 U.S.C. §§ 102/103

The Office Action rejected claims 1-14 and 17-22 under 35 U.S.C. § 102(b) based on Higuchi et al., U.S. Patent US 5708514 (“Higuchi”). The Office Action also rejected dependent claims 15, 16, and 23 under 35 U.S.C. 103(a) “over the combination between” the “fourth embodiment” of Higuchi and the “first embodiment” of Higuchi.

Higuchi discloses an image recording apparatus for recording a tone image by an electrophotographic recording method or the like. (Col. 1 ll. 8-10) As shown in FIG. 34 of Higuchi, the signal conversion section 3 determines the recording control signal of a current pixel with reference to the recording control signal of a pixel previously converted output from the storage section 13. (Col. 24, ll. 21-24) The recording control signal of the current pixel is determined by the recording control signals of pixels A and B adjacent to the current pixel X. Table 1 shows the recording control signal of the current pixel X for 16 combinations of the recording control signals of the adjacent pixels A and B. (Col. 25, ll. 48-55)

In contrast, in the present design, as shown in FIG. 2, provides a method of extending conventional error diffusion halftoning to take advantage of higher addressability (i.e. at a sub-pixel level of resolution) or pulse width modulation (PWM) capability of an output device, such as a printer. The present design modulates the pulse width of the recording control signal to express tone. According

to the present design, **an exposure difference is computed based on a difference between the modified input value and the allowable exposure configuration and applied to subsequent pixels.** Referring to FIG. 5 of the present specification, the new current error $e(i,j)$ is determined and diffused or "pushed forward" in the error diffusion process to future unprocessed pixels using the error diffusion scheme. The new current error $e(i,j)$ is the difference between the modified input of the current pixel $\tilde{f}(i,j)$ and the exposure level previously applied. For example for a modified input value and an applied exposure or allowable exposure configuration of 0.61 and 0.50, respectively, the error would be 0.11. And, using the error diffusion calculus specifically employed in the application, this remaining error is distributed to future addressed pixels; and the cycle moves sequentially to the next pixel to continue the error diffusion process.

This use of an error of this type in subsequent pixel processing materially differs from the Higuchi design, which does not employ such a "pushing forward" of error values. Higuchi simply performs calculations for a current pixel X based on image dots of the pixels A and B adjacent to pixel X. The two pixels adjacent to pixel X are used as reference pixels used to determine the reference control signal for pixel X (Higuchi, col. 27, ll. 41-54). No application of an error to subsequent pixels is disclosed.

Applicant has amended claims 1, 12, and 21 to include the aspect of "Applying an exposure difference computed based on a difference between the modified input value and the allowable exposure configuration to subsequent pixels" (claim 1) or similar language. The Higuchi design does not apply such an exposure difference nor even compute such a difference. While Applicant disagrees with the reasoning presented in the Office Action with respect to certain points made therein, such as the "pulse width" and "pulse position" of Table 1 being the same as or even similar to the sub-pixel recitation of claim 1, and the "justification value" and "exposure level" recited in claim 21 being shown by entries in Table 1, the amendment to include the "pushing forward" aspect clearly differentiates the claims from Higuchi.

Based on the foregoing, Applicant respectfully submits that amended claims 1, 12, and 21 are allowable over the references of record, and that all claims dependent from claims 1, 12, and 21 are allowable as they depend from an allowable base claim.

Regarding the obviousness (§103) rejection, Applicant initially questions the procedural propriety of an obviousness rejection, rather than a novelty or anticipation rejection, based on a “combination” of two embodiments within a single reference. According to MPEP 706.02, “in a rejection based on 35 U.S.C. 103, the reference teachings must somehow be modified in order to meet the claims.” It is unclear what modification is being suggested here to the Higuchi reference.

In any event, Applicant submits that as stated above, dependent claims 15, 16, and 23 depend from an allowable base claim and thus include limitations not found in the cited reference, either alone or as a result of a combination between the various embodiments of Higuchi, combination with general knowledge in the art, or otherwise. Thus Applicant submits that claims 15, 16, and 23 are not obvious in view of the cited reference.

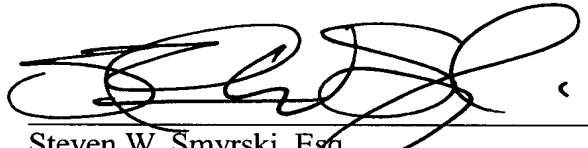
Accordingly, it is respectfully submitted that all pending claims fully comply with 35 U.S.C. §§ 102 and 103.

CONCLUSION

In view of the foregoing, it is respectfully submitted that all claims of the present application are in condition for allowance. Reconsideration of all of the claims, as amended, is respectfully requested and allowance of all pending claims at an early date is solicited.

Should it be determined for any reason an insufficient fee has been paid, please charge any insufficiency to ensure consideration and allowance of this application to Deposit Account 08-2025.

Respectfully submitted,



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EXHIBIT A